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NOTICE OF ALLOWANCE AND FEE(S) DUE

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7590

07/18/2008

STITES & HARBISON PLLC 1199 NORTH FAIRFAX STREET SUITE 900 ALEXANDRIA, VA 22314 EXAMINER

RUTHKOSKY, MARK

ART UNIT PAPER NUMBER

1795 DATE MAILED: 07/18/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,185	12/18/2000	Takayuki Araki	P06971US00/L	2588

TITLE OF INVENTION: FLUOROCOPOLYMER MATERIAL WITH SULFONIC ACID FUNCTIONAL GROUPS AS A SOLID POLYELECTROLYTE FOR USE IN FUEL CELLS

APPLN. TYPE	SMALL ENTITY	\$1440	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE \$1440	10/20/2008
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THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

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If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE

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APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE		E FEE	TOTAL FEE(S) DUE	DATE DUE
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PLEASE NOTE: Un	less an assignee is ident h in 37 CFR 3.11. Comp	ified below, no assignee	THE PATENT (print or to data will appear on the T a substitute for filing at (B) RESIDENCE: (CIT	patent. If an assign n assignment.			ocument has been filed for
Please check the appropr	riate assignee category or	categories (will not be pr	rinted on the patent):	Individual 🗖 C	orporat	ion or other private gro	oup entity Government
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,185	12/18/2000	Takayuki Araki	P06971US00/L	2588
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STITES & HARI	BISON PLLC		RUTHKOS:	KY, MARK
1199 NORTH FAIRFAX STREET			ART UNIT	PAPER NUMBER
SUITE 900 ALEXANDRIA, V	A 22314		1795 DATE MAILED: 07/18/200	8

Determination of Patent Term Extension under 35 U.S.C. 154 (b)

(application filed after June 7, 1995 but prior to May 29, 2000)

The Patent Term Extension is 0 day(s). Any patent to issue from the above-identified application will include an indication of the 0 day extension on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Extension is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 (571)-272-4200.

Aş	oplication No.	Applicant(s)
08	/700,185	ARAKI ET AL.
	caminer	Art Unit
Ma	ark Ruthkosky	1795
The MAILING DATE of this communication appears All claims being allowable, PROSECUTION ON THE MERITS IS (OR herewith (or previously mailed), a Notice of Allowance (PTOL-85) or o NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGH of the Office or upon petition by the applicant. See 37 CFR 1.313 and	R REMAINS) CLOSED in other appropriate commu TS. This application is s	n this application. If not included unication will be mailed in due course. THIS
1. 🔀 This communication is responsive to <u>4/28/2008</u> .		
2. ☑ The allowed claim(s) is/are <u>30,35,36,38-40 and 51</u> .		
 3. Acknowledgment is made of a claim for foreign priority under a) All b) Some* c) None of the: 1. Certified copies of the priority documents have been copies of the priority documents have been copies. 	en received.	
Copies of the certified copies of the priority documents have been also	• •	·
International Bureau (PCT Rule 17.2(a)).	ents have been received	un uns national stage application from the
* Certified copies not received:		
Applicant has THREE MONTHS FROM THE "MAILING DATE" of the noted below. Failure to timely comply will result in ABANDONMEN' THIS THREE-MONTH PERIOD IS NOT EXTENDABLE. 4. A SUBSTITUTE OATH OR DECLARATION must be submitted INFORMAL PATENT APPLICATION (PTO-152) which gives re-	T of this application. I. Note the attached EXA	AMINER'S AMENDMENT or NOTICE OF
5. CORRECTED DRAWINGS (as "replacement sheets") must be	. , .	
 (a) ☐ including changes required by the Notice of Draftsperson's 		v (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date	or atom Brawing Neviev	V(110 340) attached
(b) ☐ including changes required by the attached Examiner's An Paper No./Mail Date Identifying indicia such as the application number (see 37 CFR 1.84(
each sheet. Replacement sheet(s) should be labeled as such in the h		
 DEPOSIT OF and/or INFORMATION about the deposit of attached Examiner's comment regarding REQUIREMENT FOR 		
Attachment(s) 1. ☐ Notice of References Cited (PTO-892)	5. ☐ Notice of In	formal Patent Application
	<u> </u>	ummary (PTO-413),
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)		Wish Lista
 Notice of Draftperson's Patent Drawing Review (PTO-948) Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 	Paper No./	Amendment/Comment

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/28/2008 has been entered.

Claim Rejections - 35 USC § 112

The rejection of claim 30 and the claims depending from claim 30 under 35 U.S.C. 112, first paragraph, has been overcome by applicant's remarks showing disclosure of the molecular weight of segment B on page 23 of the instant specification.

Claim Rejections - 35 USC § 103

The rejection of claims 30, 35-36, 38-40, 46, and 49-52 under 35 U.S.C. 103(a) as being unpatentable over Cisar (US 6,492,431) OR Cisar (US 5,635,039) has been overcome by applicant's amendment to the claims and the declaration filed 4/28/2008.

Allowable Subject Matter

Claims 30, 35, 36, 38-40, and 51 are allowed.

The following is an examiner's statement of reasons for allowance:

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The instant claims are to a material for a solid polyelectrolyte, comprising a multisegmented fluoropolymer that comprises a block copolymer and/or a graft copolymer, wherein the copolymer contains one or more blocks essentially consisting of segment A and one or more blocks essentially consisting of segment B, the segment A combines with the segment B, wherein the segment A has a molecular weight of 5,000 to 1,000,000, and the Segment A is a copolymer chain comprising (a) an ethylenicfluoromonomer containing sulfonic acid functional groups each represented by Formula (1) $CX_2=CX^1-(O)_n-Rf-SO_2Y$, wherein X and X^1 may be the same or different and are each hydrogen or fluorine; Y is FI, C1, or OY¹ wherein y¹ is hydrogen, alkali metal or C₁-C₅ alkyl; Rf is C₁ to C₄₀ divalent fluoroalkylene or C₁ to C₄₀ divalent fluoroalkylene having one or more ether bonds; and n is 0 or 1; and (b) at least one type of ethylenic fluoromonomer copolymerizable with the ethylenic fluoromonomer (a) and containing no sulfonic acid functional groups, the segment B is a fluoropolymer containing no sulfonic acid functional groups, has a molecular weight of 3,000 to 1,200,000, and has a crystalline melting point of 100°C or higher or a glass transition point of 100°C or higher, wherein the ratio of segment A: segment B in the segmented fluoropolymer is 5:9~to98:2 30:70 to 90:10 wt. %.

The prior art does not teach the material as claimed. The most pertinent prior art has been cited. For example, Cisar (US 6,492,431) teaches a material for a solid polyelectrolyte, comprising a multi-segmented fluoropolymer that comprises a block copolymer containing at least two types of fluoropolymer chain segments differing in monomer composition, at least one type of the fluoropolymer chain segments containing sulfonic acid functional groups.

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One segment block contains polytetrafluoroethylene groups (PTFE) and another segment block contains perfluorovinyl ester with sulfonic acid functional groups. The crystalline melting point is over 300 C. The perfluorovinyl ester with sulfonic acid functional groups segment includes (a) an ethylenic fluoropolymer unit containing sulfonic acid functional groups; and (b) at least one type of ethylenic fluoromonomer unit copolymerizable with the unit (a) and containing no sulfonic acid functional groups. It is further noted that the polymer may include a sulfonyl fluoride group (figure 3 and accompanying text.) The material is commonly known as Nafion, which has an equivalent weight of 400-1600, (see example 2 for a weight of 950.) The ratio of segment A to segment B in the fluoropolymer is in the range of 5:95 to 98:2 wt. % (col. 5, lines 60-65.)

Cisar (US 5,635,039) teaches a material for a solid polyelectrolyte, comprising a multisegmented fluoropolymer that comprises a block copolymer containing at least two types of fluoropolymer chain segments differing in monomer composition, at least one type of the fluoropolymer chain segments containing sulfonic acid functional groups. The material is defined to be Nafion, which has the following structure:

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One segment block contains polytetrafluoroethylene groups (PTFE) and another segment block contains perfluorovinyl ester with sulfonic acid functional groups. The crystalline melting point is over 300 C. The perfluorovinyl ester with sulfonic acid functional groups segment includes (a) an ethylenic fluoropolymer unit containing sulfonic acid functional groups; and (b) at least one type of ethylenic fluoromonomer unit copolymerizable with the unit (a) and containing no sulfonic acid functional groups. It is further noted that the polymer may include a sulfonyl fluoride group (col. 13, lines 7-17.) The material is commonly known as Nafion, which has an equivalent weight of 400-1600, (see col. 7, lines 45-end for a weight of 1100.) The ratio of segment A to segment B in the fluoropolymer is in the range of 5:95 to 98:2 wt. % (col. 5, lines 60-65.)

The references do not teach ratio of materials or the molecular weights for segment A and segment B. The references are silent to the molecular weight of the material. The Cisar references, however, disclose materials that comprise segment blocks containing polytetrafluoroethylene groups (PTFE) and perfluorovinyl ester with sulfonic acid functional groups, commonly known as Nafion. The references show that each segment has a function in the copolymer. The Nafion component gives an ion-conducting element to the copolymer and

the PTFE component gives a structural reinforcing element to the copolymer (see '431, col. 8, lines 30-44. and col. 7, lines 15-30.) Applicant's have submitted a declaration (4/28/2008) under 37 CFR Section 1.132 that shows data for the instant invention as compared with Nafion, which is found in the cited prior art. Applicant argues on pages 20-23 of the submitted amendment that the claimed combination of materials result in a different product having the noted properties.

Based on these submissions, the rejection has been overcome and the claims are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee. The application did not include a separate abstract. Further, the non-elected claims have been canceled.

The application has been amended as follows:

- I. Cancel claims 1, 5-29, 37, and 41-44.
- II. Please change the abstract to the following:

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ABSTRACT

The invention is a material for a solid polyelectrolyte, comprising a multi-segmented fluoropolymer that comprises a block copolymer and/or a graft copolymer, wherein the copolymer contains one or more blocks essentially consisting of segment A and one or more blocks essentially consisting of segment B, the segment A combines with the segment B, wherein the segment A has a molecular weight of 5,000 to 1,000.000, and the Segment A is a copolymer chain comprising (a) an ethylenicfluoromonomer containing sulfonic acid functional groups each represented by Formula (1) $CX_2=CX^1-(O)_n-Rf-SO_2Y$, wherein X and X^1 may be the same or different and are each hydrogen or fluorine; Y is FI, C1, or OY¹ wherein y¹ is hydrogen. alkali metal or C₁-C₅ alkyl; Rf is C₁ to C₄₀ divalent fluoroalkylene or C₁ to C₄₀ divalent fluoroalkylene having one or more ether bonds; and n is 0 or 1; and (b) at least one type of ethylenic fluoromonomer copolymerizable with the ethylenic fluoromonomer (a) and containing no sulfonic acid functional groups, the segment B is a fluoropolymer containing no sulfonic acid functional groups, has a molecular weight of 3,000 to 1,200,000, and has a crystalline melting point of 100°C or higher or a glass transition point of 100°C or higher, wherein the ratio of segment A: segment B in the segmented fluoropolymer is 5:9~to98:2 30:70 to 90:10 wt. %.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's

Art Unit: 1795

supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

/Mark Ruthkosky/

Primary Examiner, Art Unit 1795